

## Reaction Kinetics & Rate Laws

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### STUDENT PRACTICE WORKSHEET

Name: \_\_\_\_\_ Date: \_\_\_\_\_

Directions: Circle the best answer for 1-6. Show your full reasoning and units for 7-8. Compare with the separate key after completing the page.

### Part A — Concept checks

**1. For rate =  $k[A]^2$ , doubling [A] changes the rate by...**

- A. 2×   B. 4×   C. 8×   D. no change

**2. The order of an overall reaction is determined from...**

- A. stoichiometric coefficients alone   B. experimental data   C. molar mass   D. periodic table group

**3. A catalyst usually...**

- A. raises  $E_a$    B. lowers  $E_a$  for a pathway   C. changes  $\Delta H$    D. changes equilibrium  $K$

**4. For a zero-order reaction in A, doubling [A] changes rate by...**

- A. 0×   B. 1×   C. 2×   D. 4×

**5. Increasing temperature often increases reaction rate because...**

- A. all collisions are always effective   B. more molecules exceed the activation barrier   C.  $\Delta H$  necessarily becomes positive   D.  $K$  must become infinite

**6. Which quantity typically has units of concentration per time?**

- A. reaction rate   B. molar mass   C. density   D. atomic number

### Part B — Application and explanation

7. If a reaction is first order in A, what happens to the rate when [A] doubles?

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8. Explain why this guideline matters, with an example of what could go wrong if you ignore it: Never assign overall reaction orders from the balanced chemical equation unless a valid elementary-step mechanism justifies it.

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### REFERENCE RELATIONSHIP

rate =  $k[A]^m[B]^n$  (orders determined experimentally)